



SEQUENCE LISTING

<10> Yu , Su-May
Shaw, Jei-Fu

<120> TRANSGENIC SEEDS EXPRESSING
AMYLOPULLULANASE AND USES THEREOF

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<140> 10/050,763

<141> 2002-01-16

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<213> Thermoana ethanolicus

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Thr	Asp	Thr	Ala	Pro	Ala	Ile	Ala	Asn	Val	Val	Gly	Asp	Phe	Gln	Ser
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Lys	Ile	Gly	Asp	Ser	Asp	Trp	Asn	Ile	Asn	Ser	Asp	Lys	Thr	Val	Met
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65					70					75					80
Pro	Ala	Gly	Asp	Tyr	Glu	Tyr	Lys	Val	Ala	Leu	Asn	His	Ser	Trp	Glu
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Gly	Gly	Gly	Val	Pro	Ser	Gln	Gly	Asn	Leu	Ser	Leu	His	Leu	Asp	Ser
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Val	Gly	Thr	Ile	Gln	Ser	Ala	Ile	Gly	Ala	Gly	Asp	Asp	Trp	Lys	Pro
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Glu	Thr	Ser	Thr	Ala	Ile	Met	Arg	Asp	Tyr	Lys	Phe	Asn	Asn	Val	Tyr
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Glu	Tyr	Thr	Ala	Asn	Val	Pro	Lys	Arg	Tyr	Tyr	Glu	Phe	Lys	Val	Thr
			180					185						190	
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Thr His Asp Pro Phe Phe Arg Phe Ala Phe Gly Ala Ile Lys Thr Gly
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 Asp Thr Val Thr Leu Arg Ile Gln Ala Lys Asn His Asp Leu Glu Ser
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 Ala Lys Ile Ser Tyr Trp Asp Asp Ile Lys Lys Thr Arg Thr Glu Val
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 Pro Met Tyr Lys Ile Gly Gln Ser Pro Asp Gly Gln Tyr Glu Tyr Trp
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 Glu Val Lys Leu Ser Phe Asp Tyr Pro Thr Arg Ile Trp Tyr Tyr Phe
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 Gln Leu Gly Gly Val Gly Lys Ala Thr Asp Thr Val Asn Lys Asp Phe
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 Glu Leu Thr Val Tyr Asp Lys Asn Leu Asp Thr Pro Asp Trp Met Lys
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 Gly Ala Val Met Tyr Gln Ile Phe Pro Asp Arg Phe Tyr Asn Gly Asp
 385 390 395 400
 Pro Leu Asn Asp Arg Leu Lys Glu Tyr Ser Arg Gly Phe Asp Pro Val
 405 410 415
 Glu Tyr His Asp Asp Trp Tyr Asp Leu Pro Asp Asn Pro Asn Asp Lys
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 Asp Lys Pro Gly Tyr Thr Gly Asp Gly Ile Trp Asn Asn Asp Phe Phe
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 Gly Gly Asp Leu Gln Gly Ile Asn Asp Lys Leu Asp Tyr Leu Lys Asn
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 Leu Gly Ile Ser Val Ile Tyr Leu Asn Pro Ile Phe Gln Ser Pro Ser
 465 470 475 480
 Asn His Arg Tyr Asp Thr Thr Asp Tyr Thr Lys Ile Asp Glu Leu Leu
 485 490 495
 Gly Asp Leu Asp Thr Phe Lys Thr Leu Met Lys Glu Ala His Ala Arg
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 Gly Ile Lys Val Ile Leu Asp Gly Val Phe Asn His Thr Ser Asp Asp
 515 520 525
 Ser Ile Tyr Phe Asp Arg Tyr Gly Lys Tyr Leu Asp Asn Glu Leu Gly
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 Ala Tyr Gln Ala Trp Lys Gln Gly Asp Gln Ser Lys Ser Pro Tyr Gly
 545 550 555 560
 Asp Trp Tyr Glu Ile Lys Pro Asp Gly Thr Tyr Glu Gly Trp Trp Gly
 565 570 575
 Phe Asp Ser Leu Pro Val Ile Arg Gln Ile Asn Gly Ser Glu Tyr Asn
 580 585 590
 Val Lys Ser Trp Ala Asp Phe Ile Ile Asn Asn Pro Asn Ala Ile Ser
 595 600 605
 Lys Tyr Trp Leu Asn Pro Asp Gly Asp Lys Asp Ala Gly Ala Asp Gly
 610 615 620
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 Phe Arg Ala Ala Ile Asn Thr Val Lys Pro Asn Ala Pro Met Ile Ala
 645 650 655
 Glu Leu Trp Gly Asp Ala Ser Leu Asp Leu Leu Gly Asp Ser Phe Asn
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 Ser Val Met Asn Tyr Leu Phe Arg Asn Ala Val Ile Asp Phe Ile Leu
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 Asp Lys Gln Phe Asp Asp Gly Asn Val Val His Asn Pro Ile Asp Ala
 690 695 700
 Ala Lys Leu Asp Gln Arg Leu Met Ser Ile Tyr Glu Arg Tyr Pro Leu

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Arg Ile Leu Thr Val Phe Gly Tyr Asn Ser Ala Asn Glu Asn Gln Asn						
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Ser Gln Glu Ala Lys Asp Leu Ala Val Lys Arg Leu Lys Leu Ala Ala						
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Ile Leu Gln Met Gly Tyr Pro Gly Met Pro Ser Ile Tyr Tyr Gly Asp						
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Glu Ala Gly Gln Ser Gly Gly Lys Asp Pro Asp Asn Arg Arg Thr Phe						
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Ser Trp Gly Arg Glu Asp Lys Asp Leu Gln Asp Phe Phe Lys Lys Val						
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Val Asn Ile Arg Asn Glu Asn Gln Val Leu Lys Thr Gly Asp Leu Glu						
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Thr Leu Tyr Ala Asn Gly Asp Val Tyr Ala Phe Gly Arg Arg Ile Ile						
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Asn Gly Lys Asp Val Phe Gly Asn Ser Tyr Pro Asp Ser Val Ala Ile						
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Val Val Ile Asn Lys Gly Glu Ala Lys Ser Val Gln Ile Asp Thr Thr						
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Lys Phe Val Arg Asp Gly Val Ala Phe Thr Asp Ala Leu Ser Gly Lys						
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Thr Tyr Thr Val Arg Asp Gly Gln Ile Val Val Glu Val Val Ala Leu						
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Asp Gly Ala Ile Leu Ile Ser Asp Pro Gly Gln Asn Leu Thr Ala Pro						
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Gln Pro Ile Thr Asp Leu Lys Ala Val Ser Gly Asn Gly Gln Val Asp						
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Leu Ser Trp Ser Ala Val Asp Arg Ala Val Ser Tyr Asn Ile Tyr Arg						
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Ser Thr Val Lys Gly Gly Leu Tyr Glu Lys Ile Ala Ser Asn Val Thr						
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Gln Ile Thr Tyr Ile Asp Thr Asp Val Thr Asn Gly Leu Lys Tyr Val						
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Tyr Ser Val Thr Ala Val Asp Ser Asp Gly Asn Glu Ser Ala Leu Ser						
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Val Tyr Ala Glu Ile Trp Ala Glu Gly Leu Thr Asp Lys Pro Gly Gln						
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Gly Glu Asn Met Ile Ala Gln Leu Gly Tyr Arg Tyr Ile Gly Asp Gly						
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Gly Gln Asp Ala Thr Arg Asn Lys Val Glu Gly Val Glu Ile Asn Lys						
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Asp Trp Thr Trp Val Asp Ala Arg Tyr Val Gly Asp Ser Gly Asn Asn						
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Asp Lys Tyr Met Ala Lys Phe Val Pro Asp Met Val Gly Thr Trp Glu						
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Tyr Ile Met Arg Phe Ser Ser Asn Gln Gly Gln Asp Trp Thr Tyr Thr						
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Lys Gly Pro Asp Gly Lys Thr Asp Glu Ala Lys Gln Phe Ile Val Val						
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Pro Ser Asn Asp Val Glu Pro Pro Thr Ala Leu Gly Leu Gln Gln Pro						
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Gly Ile Glu Ser Ser Arg Val Thr Leu Asn Trp Ser Leu Ser Thr Asp
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 Asn Val Ala Ile Tyr Gly Tyr Glu Ile Tyr Lys Ser Leu Ser Glu Thr
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 Gly Pro Phe Val Lys Ile Ala Thr Val Ala Asp Thr Val Tyr Asn Tyr
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 Val Asp Thr Asp Val Val Asn Gly Lys Val Tyr Tyr Tyr Lys Val Val
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